nimblestorage

Redefining Flash Storage

Data is the lifeblood of successful organizations. As companies grapple with exponential data growth and the increasing performance required by business-critical applications, storage systems must also adjust. Unfortunately, legacy storage systems have proven inadequate to the challenge, lacking the level of performance, scalability, availability and flexibility demanded by today's data-driven organizations.

The ideal storage solution is one that can keep pace with aggressive — and unpredictable — performance and capacity demands. And, it must effectively protect data while allowing it to be consistently available to the users who need it most. Finally, it should be able to grow as organizations do, and do so without disruption.

The Adaptive Flash platform is Nimble Storage's answer to the challenges facing modern enterprises. It intelligently and dynamically allocates storage resources, eliminating the tradeoff between performance and capacity.
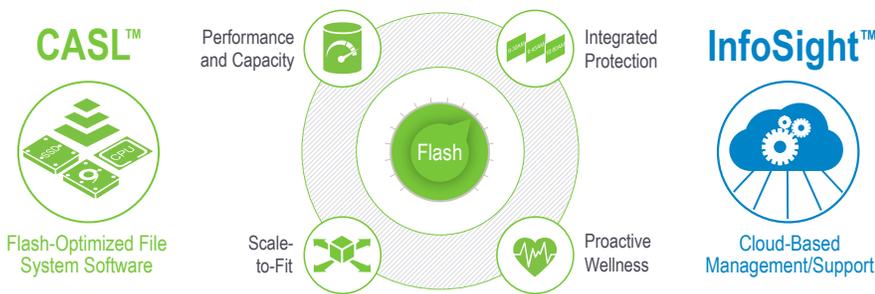
Introduction

Nimble Storage was founded in 2008, on the belief that today's business-critical applications demand an entirely new approach to storage. Nimble recognized early that IT organizations needed superior performance and capacity, and could no longer afford to sacrifice one for the other.

In 2010, Nimble delivered the first flash storage solution to offer a dramatic increase in performance as well as capacity density. By mid-2014, more than 3,000 IT organizations in industries as diverse as manufacturing, retail and financial services had endorsed Nimble's modern approach to storage.

Nimble's patented Cache-Accelerated Sequential Layout (CASL™) architecture leverages flash as a read cache, and features a unique data layout that maximizes hard disk capacity without degrading performance. Included with every Nimble array is InfoSight™, the company's groundbreaking data-sciences approach to the storage lifecycle.

CASL and InfoSight form the foundation of Adaptive Flash.

CASL and InfoSight form the foundation of Nimble Storage's Adaptive Flash platform

Adaptive Flash

Adaptive Flash represents the latest evolution in Nimble Storage's radical re-engineering of storage infrastructure. CASL decouples performance from capacity, and seamlessly and independently scales them to satisfy the demands of critical applications. InfoSight guarantees that flash will be deployed
intelligently — and dynamically — to satisfy fluctuating performance needs.

Historically, IT had to choose between performance and capacity, forcing them to create independent storage silos that are inefficient, hard to scale, and difficult to manage. Adaptive Flash eliminates that tradeoff, scaling performance and capacity as workloads require.

With Adaptive Flash, Nimble solutions:

- Accelerate performance for faster reads. A write-optimized layout delivers superior system performance.
- Optimize capacity with in-line, universal compression (delivering as much as a 75 percent reduction in data footprint with no added latency); redirect-on-write snapshots (with zero performance penalty); zero-copy cloning (based on snapshots); and thin provisioning (allocating blocks of storage on demand).
- Scale performance (compute or cache), and capacity (hard disk), independently, and with minimum disruption within a single array, or cluster. Upgrade non-disruptively with push-button provisioning.
- Protect data with instantaneous space-efficient snapshots for application consistent backups. Restore data within minutes (from months of backups) without a separate solution.
- Replicate data locally, or over a WAN, for simple and affordable disaster recovery.

Superior Performance

Nimble Storage solutions accelerate the performance of business-critical applications including Microsoft Exchange, Oracle and SQL Server databases, and virtual desktop infrastructure (VDI). Using flash as a read cache, CASL speeds read time by an order of magnitude over that of legacy storage. Because flash is fully designed into Nimble arrays — rather than bolted on as a separate tier – there is no data migration overhead.

CASL's write-optimized data layout means that Nimble delivers substantially better write performance than that of legacy storage. CASL takes full advantage of disk's fast sequential write properties, coalescing random write data in NVRAM into a full sequential stripe, and writing the data to disk sequentially, eliminating disk latency as a bottleneck. CASL supports variable block length, including application-tuned block sizes on a per-volume basis. CASL's efficient sweeping algorithms run in the background, without impacting performance.

Optimized Capacity

Nimble Storage provides more usable capacity than competing storage systems without any impact to performance. It makes use of a variety of data footprint reduction techniques including in-line compression, redirect-on-write snapshots, zero-copy clones, and thin provisioning.

Nimble leverages CASL's intelligent indexing for space-efficient snapshots and zero-copy clones (while data is maintained in compressed form). Rather than copying entire data sets, CASL indexes where data is stored and tracks incremental changes. As a result, Nimble's redirect-on-write snapshots use as many as two orders of magnitude less space than full copies without any slowdown in performance.

Zero-copy clones use the same snapshots technology to create a new read/write volume, eliminating the time-consuming process of copying data from an active volume. Snapshots and clones can be created in seconds, saving hundreds of gigabytes of disk capacity. Thin provisioning adds further capacity by only allocating storage for data-on-demand from an optimized disk pool.

Seamless Scalability

Adaptive Flash is a responsive solution to the constantly changing needs of business-critical applications. InfoSight, through its use of deep data analytics, generates expert guidance on the need for additional CPU cores, cache and capacity.

The Adaptive Flash Platform offers:

- Improved IOPS through controller upgrades
- Enhanced read performance by flexibly scaling flash cache
- Increased capacity by adding external storage shelves (with minimum downtime)
- Seamless upgrading of a single array, or storage cluster
- The ability to manage clustered arrays as a single storage entity
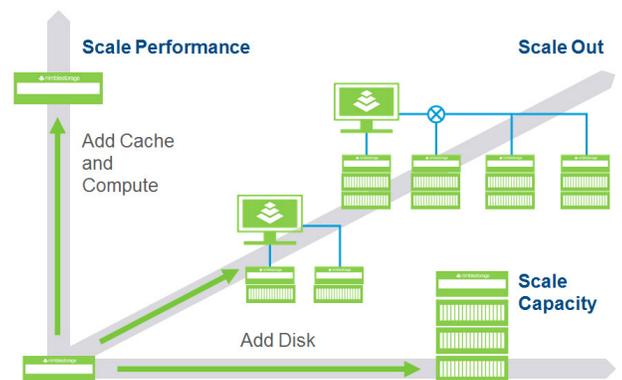
Integrated Data Protection

Nimble Storage offers integrated data protection, eliminating the need for time-consuming backups and allowing organizations to maximize system uptime. Adaptive Flash's data recovery capability simplifies data replication for offsite disaster recovery and archiving. Data can be backed up and restore in minutes, allowing more data to be protected, and dramatically improving recovery time objectives (RTOs), and recovery-point objectives (RPOs).

> "Performance is absolutely critical for us. The performance we're achieving with the Nimble Storage has proven game-changing for our development team. Today, code compilation takes a fraction of the time it once did, so idle time for developers has plummeted and productivity is at a new high."

Ethan Erchinger
Vice President of Operations, Plaxo

> "[Nimble Storage's] compression has been remarkable — and especially on VDIs, where today we are seeing compression of between 60 and 80 percent. Now, we have literally four times the space and our expansion options are seemingly limitless."

Tony Banken
Network Administrator, Central Minnesota Jobs & Training Services

With Nimble Storage, customers can non-disruptively and independently scale performance and capacity within a single array or beyond, to a scale-out cluster.

Among Nimble's innovative data protection features:

Instantaneous Snapshot-Based Backup and Restores. Highly efficient redirect-on-write snapshot technology and universal compression ensure that snapshots consume minimal storage capacity. As a result, months' worth of frequent snapshots can be saved on a single system. Nimble can be integrated with CommVault Simpana, combining Commvault's rich data protection with Adaptive Flash's efficient snapshots.

Florida Blood Services now backs up its virtual machines (VMs) every 15 minutes. Its previous SAN solutions backed up only 10 percent of its VMs daily.

EU Services, a direct mail marketing company, backs up data in 10 seconds compared to the 10 hours it took its previous solutions backup system.

First Choice Health restores 1.5TB of file data in less than 10 minutes, a job that previously stretched over an entire afternoon.

WAN-Efficient Replication. Nimble's replication capabilities are an order of magnitude more efficient and cost effective than that of traditional storage. Using "thin" replication technology, compressed block-level changes can be quickly copied to a remote array.

Application/Virtualization Backup Integration. By integrating different protection frameworks, Nimble provides application- and virtual machine-consistent backup and recovery for Microsoft and VMware environments, including Microsoft Exchange, SQL Server, and SharePoint. It simplifies and accelerates backup and recovery for virtual machines and applications. InfoSight offers detailed reports and automatic alerts on specific events like replication failure.

Simplified Management

Traditional storage systems are time consuming to deploy and manage. By simplifying storage management, Nimble Storage frees IT resources for more value-added activities.

Efficient Resiliency. Nimble incorporates advanced design elements such as fully redundant hardware with no single points of failure to address today's availability challenges.

Redundancy and Failover. Hot swappable active and standby controllers, and redundant power supplies, cooling fans and drives are standard features. CASL's data layout allows for an optimized implementation of triple-parity RAID, protecting against disk failure and minimizing performance penalties, and disk re-build times of competing systems.
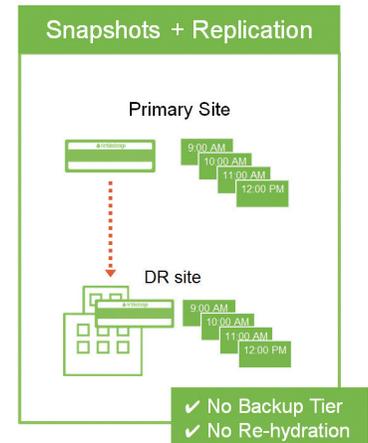
Push-Button-Simple Deployment and Operations. Streamlined storage provisioning with an intuitive user interface, automated capabilities, and integration with leading hypervisor and application solutions are standard features. Application profiles automatically tune arrays for maximum performance and configure data protection policies for various workloads, eliminating the need to manually configure or tune. Zero-copy cloning creates volumes in just three steps, saving hours of configuration and substantial capacity.

InfoSight

InfoSight is Nimble Storage's data-sciences approach to the storage lifecycle. InfoSight monitors all Nimble arrays, collectively and individually, from the cloud, gathering millions of data points to identify potential problems – and provide solutions – in real time.

"We can go wild with replication and snapshots because it costs us so little in terms of capacity. As a result, our RPOs have improved significantly."

Chris Fricke
IT Administrator
Clackamas County, Oregon

Fully-integrated data protection allows for fast replication and restores.

"We love Nimble's seamless integration with VMware, not to mention with SQL and Exchange. This makes it easy to move between the two operating environments, and it greatly simplifies backing up virtual servers. Backup of file servers, which used to take as much as three hours, is now accomplished in seconds. The same is true for other workloads."

Jozef Cabaj
Head of Infrastructure
Thomas Concrete Group AB

InfoSight consists of these components:

- **InfoSight Engine:** A data collection and analysis engine powered by deep-data analytics including system modeling capabilities and predictive algorithms.
- **InfoSight Portal:** A secure online portal that offers IT managers a window into the particulars of system performance.
- **Proactive Wellness:** Real-time alerts on overall system health, performance and protection to keep arrays in peak operational condition.

The InfoSight Engine gathers and analyzes telemetry data from Nimble arrays around the globe, using deep-data analytics to diagnose and resolve issues that traditional storage management and analysis tools often miss. InfoSight resolves acute performance issues automatically, and offers guidance on potential problems long before they can bring systems down.

Using the InfoSight Engine, Nimble's support team can securely troubleshoot and configure arrays from a remote location, offer peer insights, and/or customized guidance. Nimble arrays have achieved a collective system uptime greater than 99.999 percent, the gold standard for system availability.

The Infosight Portal is a window into the inner workings of the InfoSight engine, offering IT administrators these key benefits:
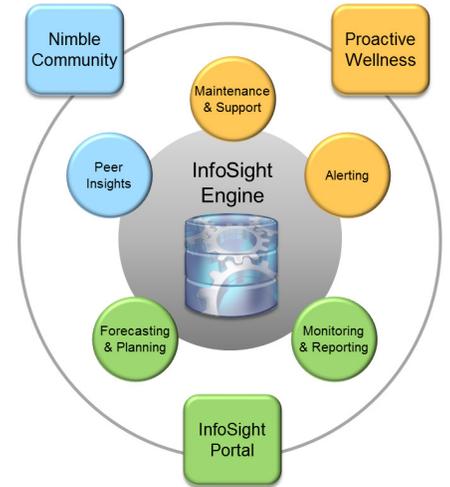
- A comprehensive overview of their storage environment
- The ability to set triggers to automatically open support requests
- Reports on capacity usage for upgrade planning
- Detailed metrics for analysis and troubleshooting
- Recommendations on performance improvements like additional cache or controller upgrades

The Nimble Storage Partner Ecosystem

Nimble Storage's SmartStack™ solutions are a collection of pre-validated reference architectures built on a rich partner ecosystem. They have been certified by leading vendors like Microsoft, VMware, Cisco, Citrix, and CommVault, SmartStack solutions are tightly integrated for performance-rich deployments including virtualization and VDI; core business applications like Microsoft Exchange and SharePoint, and the SQL Server and Oracle databases. They incorporate popular management tools including VMware vCenter and vSphere, and Microsoft VSS.

Summary

Nimble Storage's Adaptive Flash platform delivers more performance and capacity per rack unit than any storage solution on the market. Based on an innovative architecture that decouples performance from capacity, and has the ability to intelligently deploy storage resources – as needed – across diverse applications, it is the first storage solution to eliminate the performance and capacity tradeoff. Nimble customers routinely benefit from ten-fold improvements in application and VDI performance, seamless scalability, integrated data protection, and efficient operations and support.

InfoSight: Revolutionizing the storage lifecycle with deep data sciences.

"**InfoSight lets me export reports so I don't have to manually create them anymore. With a few mouse clicks, I can generate either a detailed drill-down report on volumes to troubleshoot an issue, or an executive level report to keep my management team informed.**"

Farhan Ahmad
Systems Administrator
Gardiner Roberts LLP

Learn More

Find out how Nimble Storage can modernize your datacenter. For more information contact Nimble by email at info@nimblestorage.com or visit www.nimblestorage.com.

Also visit the NimbleConnect community (connect.nimblestorage.com) and follow us on Twitter (@nimblestorage).